Space Weather Forecast

Issued on Thursday, 27 July 2023 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1/R2 Minor/Moderate radio blackouts likely.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Moderate, with two Moderate-class flares observed in the last 24 hours, both emanating from an evolving and potentially complex region close to the northwest limb. Due to the location of this region, the magnetic field is not discernible as the positive and negative polarities are foreshortened. There are 10 classified regions on the solar disc, with several of these appearing to be stable or weak and declining. At least three new regions have rotated onto the visible disc in the last 24 hours, although they too are not easy to analyse at present due to foreshortening of the satellite image. No Earth-directed Coronal Mass Ejections (CMEs) were observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind demonstrated a mixture of influences from the fading effects of the recent CME arrival and the marked transition of the Earth from the influence of a positive polarity region of the Sun to a negative polarity region, known as a solar sector boundary crossing (SSBC). Solar wind speeds started at slightly elevated levels, increasing to elevated levels due to the SSBC, before following a steady decline back to slightly elevated levels. Total magnetic field strength was weak but steady throughout. The important north-south component started persistently negative, but switched to a mainly positive orientation following the SSBC. Geomagnetic activity started Unsettled, but weakened to Quiet.

Energetic Particles / Solar Radiation: The observed count rate of high energy particles (high energy protons) has been at background levels. No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Low to Moderate activity is forecast, with a slight chance of X-flares, most likely from AR3376.

Solar Wind / Geomagnetic Activity: A CME which arrived late on 25 Jul is likely to have been the early arrival of a feature which erupted from the Sun on 23 Jul. No further CMEs are expected within the forecast period. The Earth is now transitioning into a steady environment with CME and solar wind effects waning. A fast solar wind may connect with the Earth on 28 Jul, with estimated speeds of 450-500km/s. Geomagnetic activity is expected to be mostly Quiet to Unsettled, perhaps with some Active intervals on 28 Jul due to the fast solar wind connection.

Energetic Particles / Solar Radiation: There remains a slight chance of the observed count rate of energetic particles increasing from any significant flares that occur. This risk reduces a little through the period as the active region near the northwest limb rotates across onto the farside of the Sun.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	50
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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